

Portfolio Theory

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Seminar 1

Content:

- R in a nutshell
- Obtaining financial data

R in a nutshell

- R is a programming language mostly used for statistical computing and graphics.
- Freely available at: <https://www.r-project.org/>
- Huge (and ever increasing) amount of packages.
- Active online community (e.g. on stackoverflow: <https://stackoverflow.com/>)
- Not very user friendly at the beginning.
- There are many guides available online. This is one: <https://cran.r-project.org/doc/manuals/r-release/R-intro.pdf> (but look for the one that suits you best)

R in a nutshell

- You should also install RStudio, a very useful IDE (also free) that makes working with R much more comfortable: <https://www.rstudio.com/>
- A collection of packages under the name tidyverse is now commonly used for data science and finance: www.tidyverse.org
- R Markdown allows you to interactively create documents directly from RStudio. You can check this book: <https://bookdown.org/yihui/rmarkdown/>

Obtaining financial data

Unadjusted stock prices are easily available online, but they should not be used: we need data adjusted for dividends and stock splits.

- There are many professional data providers, but most are very expensive. E.g. Datastream or Bloomberg
- Data from there usually also require to be cleaned (for missing and/or wrong data)
- Yahoo finance provides free data, but maybe not the most reliable source

Obtaining financial data

A good alternative is Alpha Vantage:

<https://www.alphavantage.co/>

- Many data are free. Other require a cheap subscription.
- Not a huge variety of data, but no need for cleaning
- Very easy to download data directly in R thanks to the “alphavantager” R package

Fama-French factors are available at the French data library:

https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

Factors for Germany from HU Berlin (might not be as reliable as US factor data):

<https://www.wiwi.hu-berlin.de/de/professuren/bwl/bb/daten/data-library>

Obtaining financial data

Other free sources a various financial data:

- <https://www.openassetpricing.com/>
- <https://www.msci.com/>
- <https://fred.stlouisfed.org/>